Presentation To

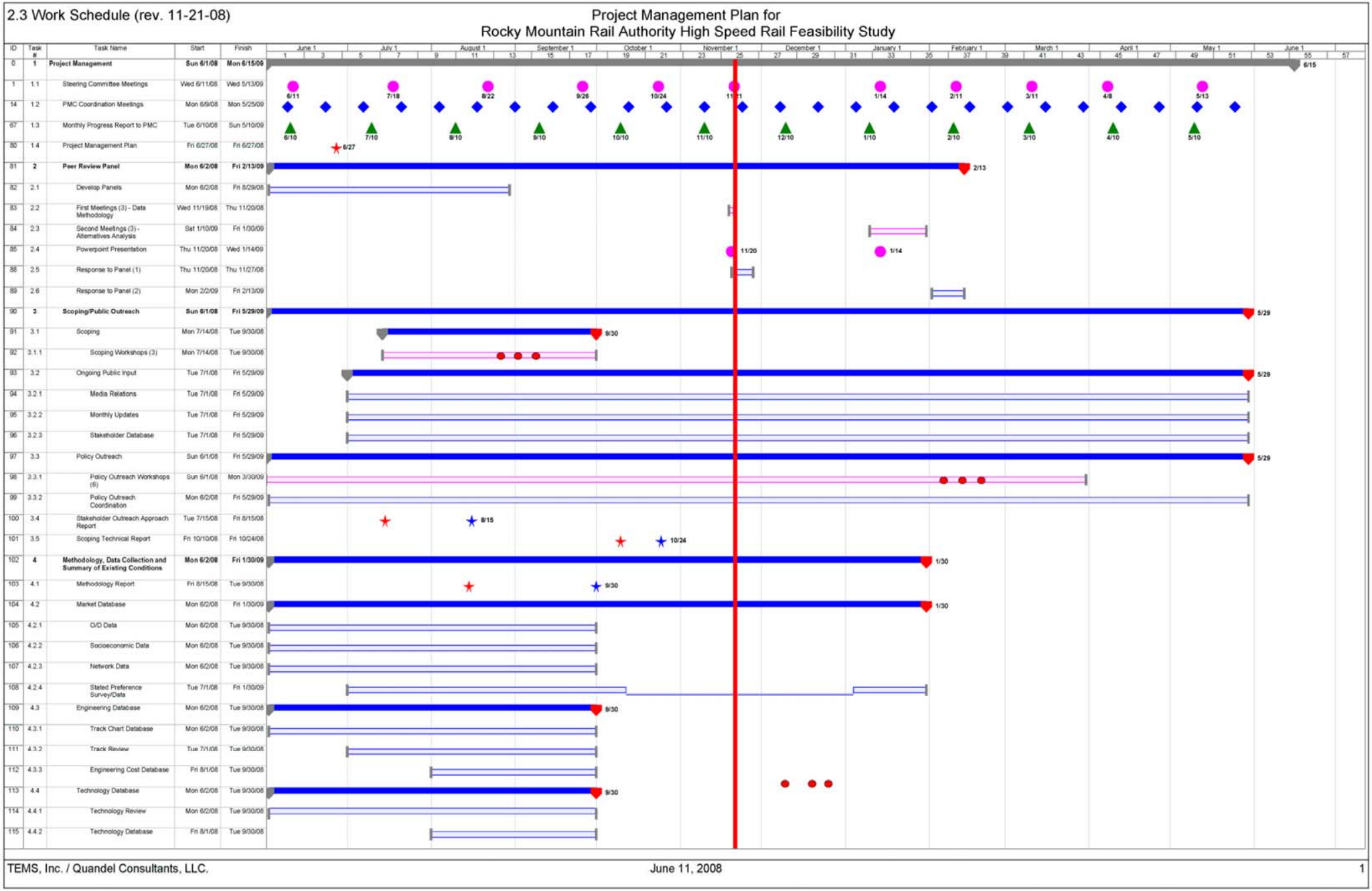
RMRA Feasibility Study Steering Committee

Feasibility Study Update

November 21, 2008

TEMS, Inc. / Quandel Consultants, LLC

Study Work Schedule: Tasks 1 thru 4.4.2


2.3 Work Schedule (rev. 11-21-08)
Project Management Plan for
Rocky Mountain Rail Authority High Speed Rail Feasibility Study
ID
Task #
Task Name
Start
Finish
June 1
July 1
August 1
September 1
October 1
November 1
December 1
January 1
February 1
March 1
April 1
May 1
June 1
0 1 Project Management Sun 6/1/08 Mon 6/15/09
1 1.1 Steering Committee Meetings Wed 6/11/08 Wed 5/13/09
14 1.2 PMC Coordination Meetings Mon 6/9/08 Mon 5/25/09
67 1.3 Monthly Progress Report to PMC Tue 6/10/08 Sun 5/10/09
80 1.4 Project Management Plan Fri 6/27/08 Fri 6/27/08
81 2 Peer Review Panel Mon 6/2/08 Fri 2/13/09
82 2.1 Develop Panels Mon 6/2/08 Fri 8/29/08
83 2.2 First Meetings (3) - Data Methodology Wed 11/19/08 Thu 11/20/08
84 2.3 Second Meetings (3) - Alternatives Analysis Sat 1/10/09 Fri 1/30/09
85 2.4 Powerpoint Presentation Thu 11/20/08 Wed 1/14/09
88 2.5 Response to Panel (1) Thu 11/20/08 Thu 11/27/08
89 2.6 Response to Panel (2) Mon 2/2/09 Fri 2/13/09
90 3 Scoping/Public Outreach Sun 6/1/08 Fri 5/29/09
91 3.1 Scoping Mon 7/14/08 Tue 9/30/08
92 3.1.1 Scoping Workshops (3) Mon 7/14/08 Tue 9/30/08
93 3.2 Ongoing Public Input Tue 7/1/08 Fri 5/29/09
94 3.2.1 Media Relations Tue 7/1/08 Fri 5/29/09
95 3.2.2 Monthly Updates Tue 7/1/08 Fri 5/29/09
96 3.2.3 Stakeholder Database Tue 7/1/08 Fri 5/29/09
97 3.3 Policy Outreach Sun 6/1/08 Fri 5/29/09
98 3.3.1 Policy Outreach Workshops (6) Sun 6/1/08 Mon 3/30/09
99 3.3.2 Policy Outreach Coordination Mon 6/2/08 Fri 5/29/09
100 3.4 Stakeholder Outreach Approach Report Tue 7/15/08 Fri 8/15/08
101 3.5 Scoping Technical Report Fri 10/10/08 Fri 10/24/08
102 4 Methodology, Data Collection and Summary of Existing Conditions Mon 6/2/08 Fri 1/30/09
103 4.1 Methodology Report Fri 8/15/08 Tue 9/30/08
104 4.2 Market Database Mon 6/2/08 Fri 1/30/09
105 4.2.1 O/D Data Mon 6/2/08 Tue 9/30/08
106 4.2.2 Socioeconomic Data Mon 6/2/08 Tue 9/30/08
107 4.2.3 Network Data Mon 6/2/08 Tue 9/30/08
108 4.2.4 Stated Preference Survey/Data Tue 7/1/08 Fri 1/30/09
109 4.3 Engineering Database Mon 6/2/08 Tue 9/30/08
110 4.3.1 Track Chart Database Mon 6/2/08 Tue 9/30/08
111 4.3.2 Track Review Tue 7/1/08 Tue 9/30/08
112 4.3.3 Engineering Cost Database Fri 8/1/08 Tue 9/30/08
113 4.4 Technology Database Mon 6/2/08 Tue 9/30/08
114 4.4.1 Technology Review Mon 6/2/08 Tue 9/30/08
115 4.4.2 Technology Database Fri 8/1/08 Tue 9/30/08
6/11
7/18
8/22
9/26
10/24
11/21
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June 11, 2008
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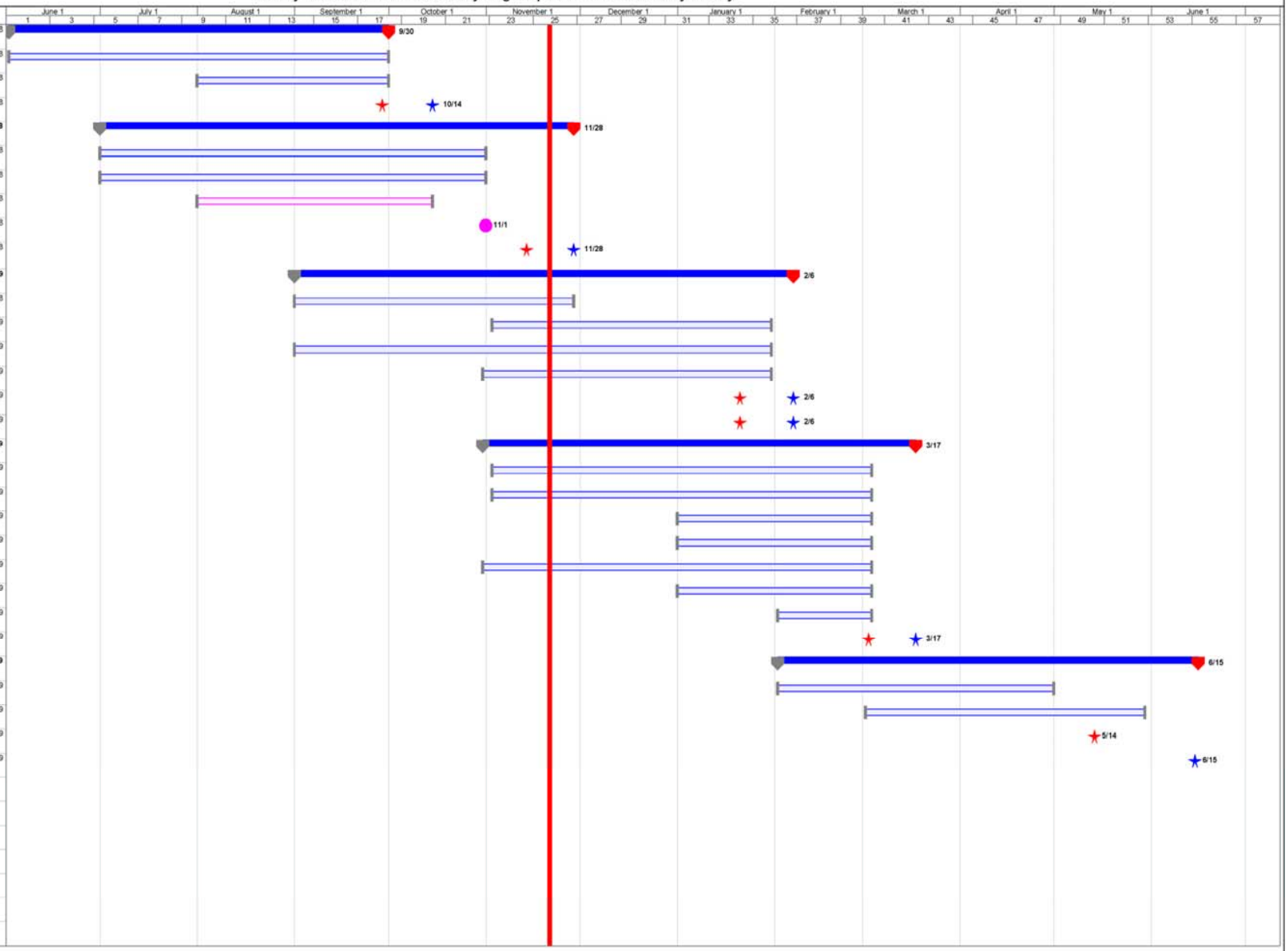
Study Work Schedule: Tasks 4.5 thru 8.4

2.3 Work Schedule (rev. 11-21-08)

Project Management Plan for
Rocky Mountain Rail Authority High Speed Rail Feasibility Study

ID	Task #	Task Name	Start	Finish
116	4.5	Property Database	Mon 6/2/08	Tue 9/30/08
117	4.5.1	Develop Station Plan	Mon 6/2/08	Tue 9/30/08
118	4.5.2	Develop Station Database	Fri 8/1/08	Tue 9/30/08
119	4.6	Existing Conditions Report	Mon 9/29/08	Tue 10/14/08
120	**5.0**	**Preliminary Service Scenarios**	**Tue 7/1/08**	**Fri 11/28/08**
121	5.1	Review Alternative Routes/Technology	Tue 7/1/08	Fri 10/31/08
122	5.2	Develop Service Concepts	Tue 7/1/08	Fri 10/31/08
123	5.3	Alternatives Development Workshop Preparation	Fri 8/1/08	Tue 10/14/08
124	5.3.1	Alternatives Development Workshop	Sat 11/1/08	Sat 11/1/08
125	5.4	Alternatives Development Technical Report	Fri 11/14/08	Fri 11/28/08
126	**6**	**Alternatives Analysis**	**Mon 9/1/08**	**Fri 2/6/09**
127	6.1	Calibrate COMPASS™ Demand Model	Mon 9/1/08	Fri 11/28/08
128	6.2	Prepare Ridership and Revenue Forecasts	Mon 11/3/08	Fri 1/30/09
129	6.3	Interactive Analysis	Mon 9/1/08	Fri 1/30/09
130	6.4	Develop Operating and Capital Costs	Fri 10/31/08	Fri 1/30/09
131	6.5	Ridership and Revenue Report	Wed 1/21/09	Fri 2/6/09
132	6.6	Alternatives Technical Report	Wed 1/21/09	Fri 2/6/09
133	**7**	**Feasibility Determination**	**Fri 10/31/08**	**Tue 3/17/09**
134	7.1	Financial Analysis	Mon 11/3/08	Tue 3/3/09
135	7.2	Economic Analysis - Users	Mon 11/3/08	Tue 3/3/09
136	7.3	Economic Analysis - Communities	Thu 1/1/09	Tue 3/3/09
137	7.4	Financing and Funding Arrangements	Thu 1/1/09	Tue 3/3/09
138	7.5	Institutional Framework	Fri 10/31/08	Tue 3/3/09
139	7.6	Allocation of Costs and Revenues	Thu 1/1/09	Tue 3/3/09
140	7.7	Final Recommendation	Mon 2/2/09	Tue 3/3/09
141	7.7.1	Recommendation Memorandum	Tue 3/3/09	Tue 3/17/09
142	**8**	**Task Documentation**	**Mon 2/2/09**	**Mon 6/15/09**
143	8.1	Implementation Plan	Mon 2/2/09	Thu 4/30/09
144	8.2	Business Plan	Mon 3/2/09	Fri 5/29/09
145	8.3	Draft Report	Thu 5/14/09	Thu 5/14/09
146	8.4	Final Report	Mon 6/15/09	Mon 6/15/09



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Public Involvement / Outreach

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Alternatives Corridor Input Team Meetings

- **Meetings will summarize alternatives**
- **Project team managing more of the invitation process**
  - Previous meeting announcements handled by MPOs and I-70 Coalition
- **RSVPs already indicating stronger interest/participation**
- **Strongly encourage all RMRA members to attend**

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Corridor Input Team Meeting Schedule

I-70 Corridor Input Team Meeting
Thursday, December 11
9 - 11 a.m.
Frisco, Glenwood Springs, Steamboat Springs

Denver Metro Area Input Team Meeting
Wednesday, December 17
3 - 5 p.m.
DRCOG

I-25 Corridor Input Team Meeting
Thursday, December 18
10 a.m. - 12 p.m.
Pueblo, Fort Collins

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Upcoming Media Outreach

- **News release distributed statewide the week of Dec. 1**
- **Individual follow-up with media outlets**
- **Two primary goals:**
  - Generate awareness among the general public of the alternatives that will be considered
  - Increase attendance at Corridor Input Team meetings

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Materials Updates

- Refine project fact sheet based on alternatives
- Develop “alternatives fact sheet”
- Post updates to the project web site
- Distribute new fact sheet to stakeholder database
- Community Partnership Program outreach slated for January

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Alternatives Development

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Station Spacing

Local Bus (10mph)

2-4 blocks

Commuter Rail (30-50mph)

3-7 miles

Intermediate Rail (90-120mph)

10-30 miles

High Speed Rail (120-200mph)

20-50 miles

Maglev (250mph)

20-100 miles

Increased Speed Means
Greater Station Spacing

RMRA Study Range

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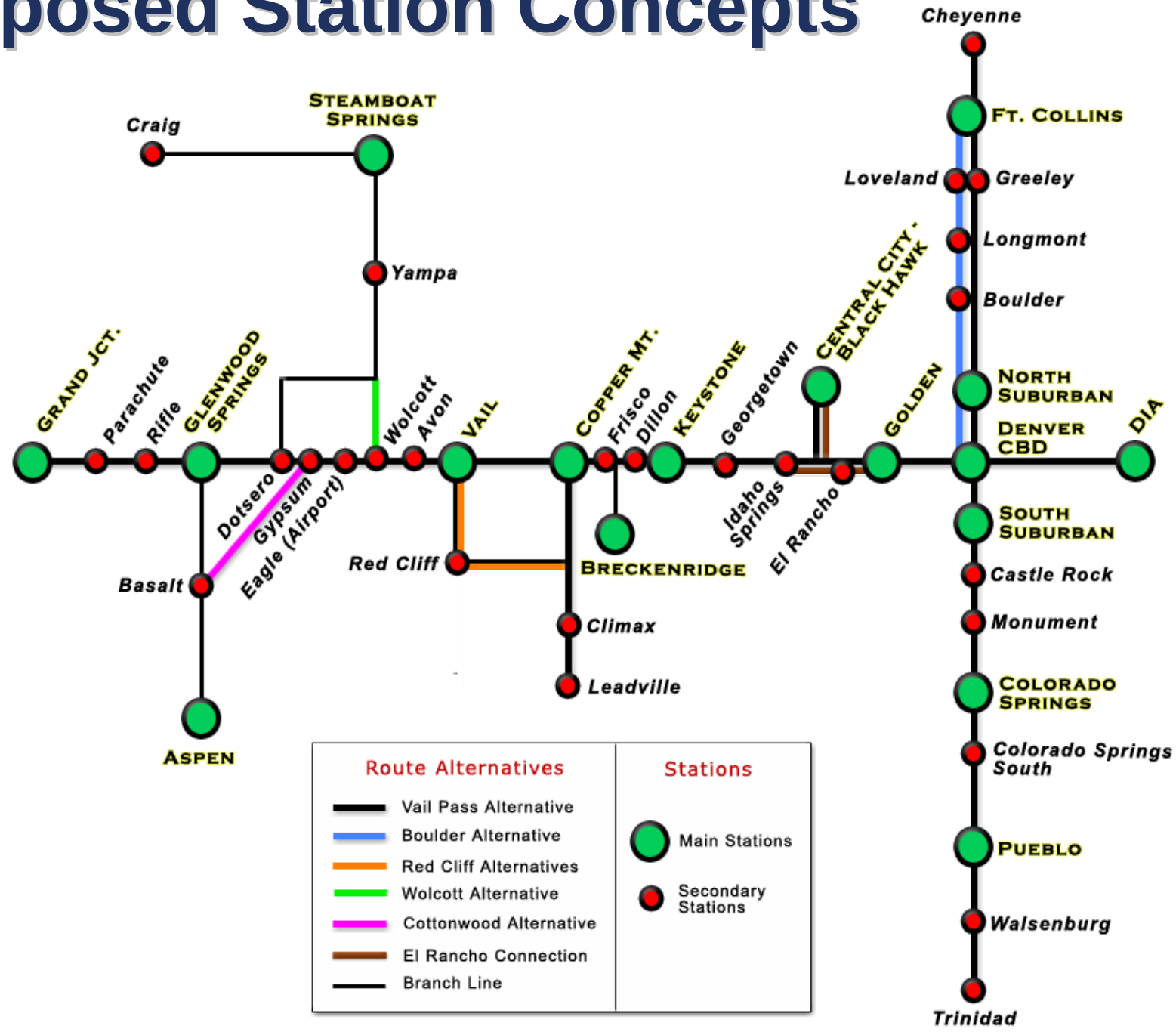
Proposed Station Concepts



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Generic Technology Categories

	79-mph	110-130 mph	150-220 mph	250-300 mph
Rail	X	X	X	
Maglev		X		X

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Conventional Rail – Representative Trains

Conventional Amtrak

Colorado Railcar DMU

Stadler FLIRT EMU

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High Speed Rail – Representative Trains

Talgo T21

Flexliner DMU

X 2000

ICE-T EMU

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High Speed Maglev – Representative Trains

Proposed Colorado Maglev

American Maglev

HSST

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Very High Speed Rail – Representative Trains

Siemens ICE-3 EMU

TGV Atlantique

Amtrak Acela

Shinkansen

Eurostar

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Ultra High Speed Rail – Representative Train

Transrapid Maglev

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Representative "Generic" Trains by Category

Conventional Rail 79-mph	**Amtrak Train** A conventional, non- tilting passenger train Diesel locomotive hauled (FRA Tier I compliant)	
High Speed Rail 110-130 mph	**Talgo T-21** Diesel locomotive-hauled (FRA Tier I compliant, Electric-hauled option also available)	
High Speed Maglev 110-130 mph	**Colorado Maglev** (FRA Non-compliant)	

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Representative "Generic" Trains by Category (continued)

Very High Speed Rail **150-220 mph**	**Eurostar** Electric locomotive-hauled with booster under first and last car (FRA Tier II compliant with 10% weight penalty)	
	ICE-T EMU Retained for grades exceeding 4% (FRA Tier I/II compliant with 7-10% weight penalty, same performance as Eurostar under 4% grade)	
Ultra High Speed Maglev **250-300 mph**	**Transrapid Maglev** (FRA Non-compliant)	

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Proposed Preliminary Scenarios

Corridor		I-25 North	I-25 South		I-70 (Avon and East)	I-70 (Avon and West)
Alternative						
1 (a)		• Diesel Technology • 79 mph Track Speed • Existing Rail, without R2C2	• Diesel Technology • 79 mph Track Speed • Existing Rail, without R2C2		N/A	N/A
1 (b)		• Diesel Technology • 79 mph Track Speed • Existing Rail, with R2C2	• Diesel Technology • 79 mph Track Speed • Existing Rail, with R2C2		N/A	N/A
2 (a)		• Diesel Technology • 110 mph Track Speed • Existing Rail, without R2C2	• Diesel Technology • 110 mph Track Speed • Existing Rail, without R2C2		N/A	N/A
2 (b)		• Diesel Technology • 110 mph Track Speed • Existing Rail, with R2C2	• Diesel Technology • 110 mph Track Speed • Existing Rail, with R2C2		N/A	N/A
3 (a)		• Maglev Technology • 125 mph Track Speed • I-25 Highway Corridor Alignment	• Maglev Technology • 125 mph Track Speed • I-25 Highway Corridor Alignment		• Maglev Technology • 125 mph Track Speed • I-70 Highway Footprint Alignment	• Maglev Technology • 125 mph Track Speed • I-70 Highway Footprint Alignment

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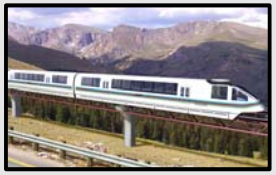
Proposed Preliminary Scenarios

Corridor		I-25 North	I-25 South		I-70 (Avon and East)	I-70 (Avon and West)
Alternative						
3 (b)		• Maglev Technology • Max. 125 mph Track Speed • I-25 Highway Corridor Alignment	• Maglev Technology • Max. 125 mph Track Speed • I-25 Highway Corridor Alignment		• Maglev Technology • Max. 125 mph Track Speed • I-70 Highway Corridor Alignment	• Maglev Technology • Max. 125 mph Track Speed • I-70 Highway Corridor Alignment
3 (c)		• Maglev Technology • Max. 125 mph Track Speed • I-25 Highway Corridor Alignment	• Maglev Technology • Max. 125 mph Track Speed • I-25 Unconstrained Alignment		• Maglev Technology • Max. 125 mph Track Speed • I-70 Unconstrained Alignment	• Maglev Technology • Max. 125 mph Track Speed • I-70 Unconstrained Alignment
4		• Electric Technology • Max. 150 mph Track Speed • Existing Rail, with R2C2	• Electric Technology • Max. 150 mph Track Speed • Existing Rail, with R2C2		• Electric Technology • Max. 150 mph Track Speed • I-70 Unconstrained Alignment	• Electric Technology • Max. 150 mph Track Speed • I-70 Unconstrained Alignment
5		• Electric Technology • Max. 220 mph Track Speed • I-25 Highway Corridor Alignment	• Electric Technology • Max. 220 mph Track Speed • I-25 Unconstrained Alignment		• Electric Technology • Max. 220 mph Track Speed • I-70 Unconstrained Alignment	• Electric Technology • Max. 220 mph Track Speed • I-70 Unconstrained Alignment
6 (a)		• Maglev Technology • Max. 300 mph Track Speed • I-25 Highway Corridor Alignment	• Maglev Technology • Max. 300 mph Track Speed • I-25 Unconstrained Corridor Alignment		• Maglev Technology • Max. 300 mph Track Speed • I-70 Highway Corridor Alignment	• Maglev Technology • Max. 300 mph Track Speed • I-70 Highway Corridor Alignment

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Proposed Preliminary Scenarios

Corridor		I-25 North	I-25 South		I-70 (Avon and East)	I-70 (Avon and West)
Alternative						
6 (b)		• Maglev Technology • Max. 300 mph Track Speed • I-25 Highway Corridor Alignment	• Maglev Technology • Max. 300 mph Track Speed • I-25 Unconstrained Alignment		• Maglev Technology • Max. 300 mph Track Speed • I-70 Unconstrained Alignment	• Maglev Technology • Max. 300 mph Track Speed • I-70 Unconstrained Alignment

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Proposed Preliminary Scenarios – Technology Definitions

RMRA Technology - Definitions					
Diesel, 79 mph Track Speed	Diesel 110 to 130 mph Track Speed	Maglev, 125 mph Track Speed	Electric, 110 to 150 mph Track Speed	Electric, 150 to 220 mph Track Speed	Maglev, 250 to 300 mph Track Speed
Conventional Rail, FRA Compliant, Diesel Powered, Locomotive Pulled or Diesel Multiple Unit, Non-Tilt	**High Speed Rail, FRA Compliant Diesel Powered, Locomotive Pulled or Diesel Multiple Unit, with Tilt**	**Vehicle and performance capability as defined by the 2004 FTA Colorado Maglev Project Study using an advanced vehicle derived from the Japanese HSST technology. It is also assumed that the American Maglev and General Atomics Maglev passenger vehicles will be in this technology and performance category.**	**High Speed Rail, FRA Compliant, Electric Powered, Locomotive Pulled or Electric Multiple Unit, with Tilt**	**Very High Speed Rail, FRA Compliant, Electric Powered, Locomotive Pulled or Electric Multiple Unit, with Tilt**	**Vehicle technology and performance capability based on the Siemens Transrapid maglev vehicle technology.**

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Proposed Preliminary Scenarios – Route Definitions

RMRA Route - Definitions					
	Existing Rail	Existing Rail with R2C2	I-25 Corridor Footprint	I-25 Corridor Alignment	I-25 Unconstrained Alignment
I-25 North-South Routes	**Rail alignment largely within the existing BNSF and UP railroad right of ways, but allowing freight traffic within those rights of way.**	**Rail alignment largely within the existing BNSF and UP railroad rights of way, but under the assumption that thru freight traffic is moved to another alignment further east as evaluated in the R2 C2 Study.**	**N/A**	**Rail alignment following the I-25 highway right of way including, but not limited to the shoulder to shoulder actual width of the existing highway. The alignment can be on-grade, elevated or tunneled to make the best use of the highway right of way in order to minimize grade changes and maximize curve distances.**	**Rail alignment capable of being within the highway corridor alignment as defined above, but can also be on-grade, elevated or tunneled in truly "Greenfield" areas completely outside the highway corridor, including areas to the east outside the I-25 highway right of way and outside the freight railroad rights of way. This is the most unconstrained rail alignment designed to minimize grade changes and maximize curve distances and still reach the critical Front Range passenger markets.**
	Existing Rail	Existing Rail with R2C2	I-70 Corridor Footprint	I-70 Corridor Alignment	I-70 Unconstrained Alignment
I-70 East-West Routes	**West of Avon the rail alignment will parallel the existing UP railroad right of ways, but allowing for freight traffic within those rights of way and deviating where there is an advantage.**	**N/A**	**Elevated rail alignment within the shoulder to shoulder actual width of the existing highway and completely within the highway right of way. The structured rail alignment can vary between above the highway shoulders, above the highway lanes or above the highway median to minimize grade changes and maximize curve distances. It will also include on-grade sections in tunnels parallel to the current highway tunnels.**	**Rail alignment capable of being in the highway footprint as described above but can also be on-grade, elevated, or tunneled in areas outside the actual highway footprint and highway right of way in order to make use of the corridor valley and hillsides to minimize grade changes and maximize curve distances. A highway corridor rail alignment will remain within the primary I-70 highway corridor and does not include adjacent highway corridor right of way such as US 6, US 40, US 24 or SH 91 or any freight railroad right of way.**	**Rail alignment capable of being within the highway corridor and highway footprint alignments as defined above, but can also be on-grade, elevated or tunneled in areas completely outside the highway corridor including adjacent highways and adjacent railroad rights of way. This is the most unconstrained rail alignment designed to minimize grade changes and maximize curve distances and still reach the critical mountain corridor passenger markets.**

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Thank You

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